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Results of the 2002 Postharvest Chemical Use Survey

Overview: The agricultural chemical use estimates in this report are based on data compiled from the 2002 Postharvest Chemical Use Survey. The Postharvest Survey was conducted for apples in the late summer to fall of 2002, referencing the 2001 crop year apples stored. All results refer to pesticide applications made at off-farm storage facilities after the fruits were harvested. These applications were made at the fruit storage facility of the processing facility. On-farm postharvest applications were beyond the scope of this survey. The time frame for postharvest applications were beyond the scope of this survey. The time frame for postharvest applications included in this publication was from August 1, 2001 to September 30, 2002. In the six States surveyed, there were 689 apple storage facility reports summarized. Apples moving from a storage operation to a packing/shipping operation will be duplicated in the reported total amount handled. The intent of the survey was to obtain the entire amount of chemicals applied to stored apples, therefore, this duplication is necessary. All apples handled in the selected States in the survey were included; State or region of origin was not considered a factor. Totals for the States surveyed as well as individual State totals are published for the percent of apples treated, rate per application, rate per marketing year, and the total amount of active ingredient applied. Other tables included in this report detail total pesticide usage by class, methods of pesticide applications, and volume of fruit treated with wax. Though commonly used as a carrier, the active ingredient petroleum distillate is reported in the insecticide class of postharvest chemicals applied, based on the EPA classification. Apple storage operators were also asked a series of questions concerning their pest management practices related to the fruit handled. Answers to these questions are summarized and included in this report.

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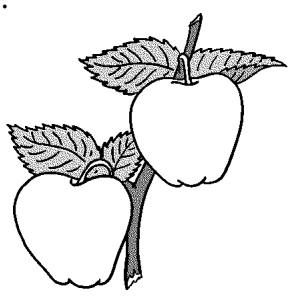
Highlights: 2001 Apple Postharvest Agricultural Chemical Use Survey -

Apple storage facilities and processors applied a total of 222,100 pounds of postharvest active ingredients to stored apples during August 2001 through September 2002 in the five States surveyed. This total amount applied includes fungicides as well as other types of chemicals including antioxidants, waxes, and fruit wash/cleaner treatments. States surveyed for apple postharvest chemical use do not necessarily correspond to major apple producing States.



Commonly Used Active Ingredients on Apples: The active ingredient most commonly used as a postharvest application, based on total pounds applied in the surveyed States, was diphenylamine, at 101,100 pounds, followed by thiabendazole, at 48,800 pounds. Diphenylamine is actually a plant growth regulator used to control storage scald and thiabendazole is a fungicide that prevents postharvest decay. Of the total chemical applications made to the 2001-02 marketing year apples in the five selected States, 47 percent were drench applications, 28 percent by direct spray, and 17 percent in the dump tank, while 8 percent used a drip or brush-on method.

Apples: Postharvest Chemical Applications, Percent Treated and Total Appplied, Program States and Total, 2001-02 Marketing Year

State	Volume Handled	Percent Treated and Total Applied			
		Fungicide		Other Chemical	
	Mil. Lbs.	*Percent*	*1,000 Lbs.*	*Percent*	*1,000 Lbs.*
CA	599.3	5.28	2.9	18.20	2.9
MI	1,261.0	7.51	1.1	18.77	4.7
NY	1,089.0	13.84	3.9	19.94	4.3
PA	**860.5**	**8.28**	**2.5**	**19.84**	**3.1**
WA	5,810.7	43.97	45.1	60.06	151.6
Total	9,620.4	30.18	55.4	43.90	166.7

Apples: Postharvest Chemical Applications, Chemical Application Rates and Total Applied, 2001-02 Marketing Year [1] [2]

Agricultural Chemical	Volume Treated	Applications	Rate per Application	Rate per Mkt. Year	Total Applied
	Percent	*Number*	*Lbs. per 1,000 Lbs.*	*Lbs. per 1,000 Lbs.*	*1,000 Lbs.*
Fungicides:					
Captan	1.51	1.0	0.02	0.02	3.0
Sodium o-phenylphenate	0.55	1.0	0.06	0.06	3.3
Thiabendazole	28.76	1.3	0.01	0.02	48.8
Other:					
Calcium chloride	0.51	1.0	0.15	0.15	7.2
Chlorine	15.62	1.0	*	*	1.4
Chlorine dioxide	9.52	1.0	*	*	1.4
Citric acid	4.10	1.1	0.04	0.04	15.5
Diphenylamine	21.76	1.0	0.05	0.05	101.1
Dodecylbenzene sodium sulfionate	2.31	1.0	*	*	0.3
Dodecylbenzenesulfonic acid	3.01	1.1	*	*	0.9
Hydrogen chloride	5.97	1.1	0.01	0.01	6.0
Phosphoric acid	10.60	1.1	0.01	0.01	13.9
Silicon emulsion	11.36	1.2	*	*	0.1
Sodium hypochlorite	9.87	1.1	0.02	0.02	18.2

* Rate applied is less than 0.01 pounds per 1,000 pounds. [1] Volume handled by apple storage and processing facilities in the five States surveyed was 9,620.4 million pounds. **States included are CA, MI, NY, PA, and WA.** [2] Insufficient or limited reports to publish usage data for benomyl, acidic cleaner, alkaline cleaner, Candida oleophila isolate, ethoxyquin, fruit wax, organic cleaner, Pseudomonas syringae ESC-10, Pseudomas syringae ESC-11, and sodium chlorite.

Apples: Postharvest Chemical Applications, Chemical Application Rates and Total Applied, Pennsylvania, 2001-02 Marketing Year [1] [2]

Agricultural Chemical	Volume Treated	Applications	Rate per Application	Rate per Mkt. Year	Total Applied
	Percent	*Number*	*Lbs. per 1,000 Lbs.*	*Lbs. per 1,000 Lbs.*	*1,000 Lbs.*
Diphenylamine	6.05	1.2	0.03	0.03	1.6

[1] Volume handled by Pennsylvania apple storage and processing facilities was 860.5 million pounds. [2] Insufficient or limited reports to publish usage data for captan, chlorine, ethoxyquin, fruit wax, silicon emulsion, sodium hypochlorite, sodium o-phenylphenate, and thiabendazole.

Apples: Postharvest Wax Applications, Percent of Apples Treated with Wax, Program States and Total, 2001-02 Marketing Year

State	Percent of Volume Treated	Total Volume Handled
	Percent	*Million Lbs.*
CA	14.24	599.3
MI	10.46	1,261.0
NY	10.39	1,089.0
PA	**17.17**	**860.5**
WA	39.03	5,810.7
Total	28.54	9,620.4

Apples: Postharvest Chemical Use, Application Methods Used, Total of Program States, 2001-02 Marketing Year

Application Method	Total of States Surveyed
	Percent
Dip in Float/Dump Tank	17.0
Direct Spray	28.1
Drench	46.6
Drip/Brush-On	8.2
Gas/Fog	0.1

Apples: Pest Management Practices, Percent of Operations Utilizing Practice, Total of Program States, 2001-02 Marketing Year

Practice	Program States					
	CA	MI	NY	**PA**	WA	ALL
	Percent of Operations					
Mechanical Devices:						
Bin liners to ease scuffing	21	3	6	**9**	51	15
Cull rotten fruit	42	43	44	**28**	46	40
Elevated CO2 levels	6	20	25	**3**	13	15
Frequently changed dump tank or process water	53	42	44	**29**	61	44
Infrared		1			2	1
Insecticides on bin piles	2	2	5		6	3
Low oxygen levels	4	34	31	**6**	43	27
Ozone to cleanse process water	4	1			3	1
Pest or rodent controls	60	63	79	**52**	72	66
Plastic bins to reduce spore counts	34	8	10	**11**	24	14
Cleaning Activities:						
Clean or sanitize packing equipment	74	59	53	**54**	69	59
Clean or sanitize structures in CA rooms	25	38	30	**18**	66	36
Control vegetation around bins	74	55	64	**57**	76	63
Hose down or empty bins/boxes	64	46	42	**47**	52	48
Pick up spilled fruit	91	83	86	**84**	82	84
Spray bins/walls with insecticide	26	36	29	**16**	65	34
Sweep, spray, or vacuum facility floors	92	88	90	**93**	89	90

Apples: Pest Management Practices, Percent of Operations Utilizing Practice,
Total of Program States, 2001-02 Marketing Year

Practice	Program States					
	CA	MI	NY	**PA**	WA	ALL
	Percent of Operations					
Measure Storage Facility Temperature:						
Controlled Atmosphere:						
Automatically monitored	21	11	10	**8**	50	18
Hourly	2	1	4		6	2
Daily	11	26	20	**4**	7	16
Twice a week	2	1				1
Weekly	2	1			1	1
Other		5	1	**1**		2
Do not monitor	2			**1**		
Regular storage:						
Automatically monitored	11	9	10	**10**	31	13
Hourly	6	2	1		7	2
Daily	34	54	53	**65**	31	51
Twice a week	4	4	2	**7**	2	4
Weekly		5	2	**4**	3	3
Other		5	1	**5**	7	4
Do not monitor	15	2	2	**5**	1	4
Other Structures:						
Automatically monitored		1			7	2
Hourly					1	
Daily	2	3	6	**5**	4	4
Twice a week	2					
Weekly						
Other			1	**1**	5	1
Do not monitor	13	5	7	**2**	2	5